

MISSISSIPPI FLORA. IV. DICOTYLEDON FAMILIES WITH AQUATIC OR WETLAND SPECIES

SAMUEL B. JONES, JR.

Department of Botany, The University of Georgia,
Athens, Georgia 30602

ABSTRACT Keys, distribution maps, habitats, references, nomenclature, and notes are given for some 12 families of dicotyledons occurring naturally or naturalized in Mississippi. These families contain one or more species which are found in aquatic or wetland habitats. They are: Bataceae, Callitrichaceae, Ceratophyllaceae, Elatinaceae, Haloragaceae, Hydrophyllaceae, Lentibulariaceae, Lythraceae, Nymphaeaceae, Podostemaceae, Polygonaceae, and Saururaceae.

INTRODUCTION

The first paper in this series treated some of the monocotyledon families with aquatic or wetland species (Jones 1974). The primary aim of this paper is to improve our knowledge of some of the dicotyledon families with aquatic and wetland plants in Mississippi. Hopefully, this paper will be reviewed and criticized by many, and corrected before the proposed Guide to the Flora of Mississippi is published. Any overlooked species, additional collections, needed modifications, or suggestions should be sent to me as soon as possible so that corrections can be made.

In undertaking any floristic work one must use information previously published. Included here are the various manuals that cover some of the species that are found in Mississippi: Small (1933), cited as S in the synonymy; Fernald (1950), cited as F; Gleason and Cronquist (1963) cited as G; Radford, Ahles, and Bell (1968), cited as R. Other frequently used manuals included Steyermark (1963) and Correll and Johnston (1970). Noteworthy is the illustrated manual of aquatic and wetland plants by Correll and Correll (1972) which I highly recommend. Many taxonomic revisions were also used in the preparation of the present paper and they are cited in the text.

The keys to the genera and species not only include the

plants of our area, but in many instances have been written to include plants that might eventually be found in Mississippi. Unless otherwise noted, I have examined one or more specimens of each species from the state. Specimens were examined at the following herbaria: University of Mississippi, Mississippi State University, and the University of Georgia. The taxonomic format follows that of the contributors guide to the Mississippi Flora project. The abbreviation of authors' names in this paper follows that of Correll and Johnston (1970). It should be noted that some species are included which do not grow in aquatic or wetland habitats. This was necessary in order to test the keys within the families for the proposed guide. Family keys were not included since all dicotyledon families are not covered in this paper. I would suggest to the reader the family keys in Correll and Johnston (1970), Correll and Correll (1972), or Gleason and Cronquist (1963).

The physiographic regions of Mississippi, based upon Lowe (1921), are outlined in Figure 1. The abbreviations used in the text are: 1) Tennessee River Hills, TRH; 2) Northeastern Prairie Belt, NPB; 3) Pontotoc Ridge, PR; 4) Flatwoods, FW; 5) North Central Plateau, NCP; 6) Jackson Prairie, JP; 7) Loess Bluff Hills, LBH; 8) Yazoo-Mississippi Delta, YMD; 9) Longleaf Pine Region, LPR; 10) Coastal Pine Meadows, CPM.

BATACEAE

1. BATIS L.

1. *B. maritima* L., June-Aug. Brackish marshes, salt flats, mud flats; common along the coastal strands. Fig. 1.

CALLITRICHACEAE

1. CALLITRICH L. WATER STARWORT, WATER CHICKWEED

- | | |
|--|-----------------------------|
| 1. Fruit as long as wide or a little longer, rarely slightly wider than long; stigmas 0.7 mm or more long; anthers 0.3-1.5 mm wide; plant amphibious | 1. <i>C. heterophylla</i> . |
| 1. Fruit broader than long by at least 0.2 mm; stigmas 0.2-0.4 mm long; anthers 0.1-0.2 mm wide; plants mostly terrestrial or on mud. | |
| 2. Fruit 0.3-0.8 mm wide, gibbous at base | 2. <i>C. peploides</i> . |
| 2. Fruit 0.5-1.2 mm wide, not gibbous at base. | |

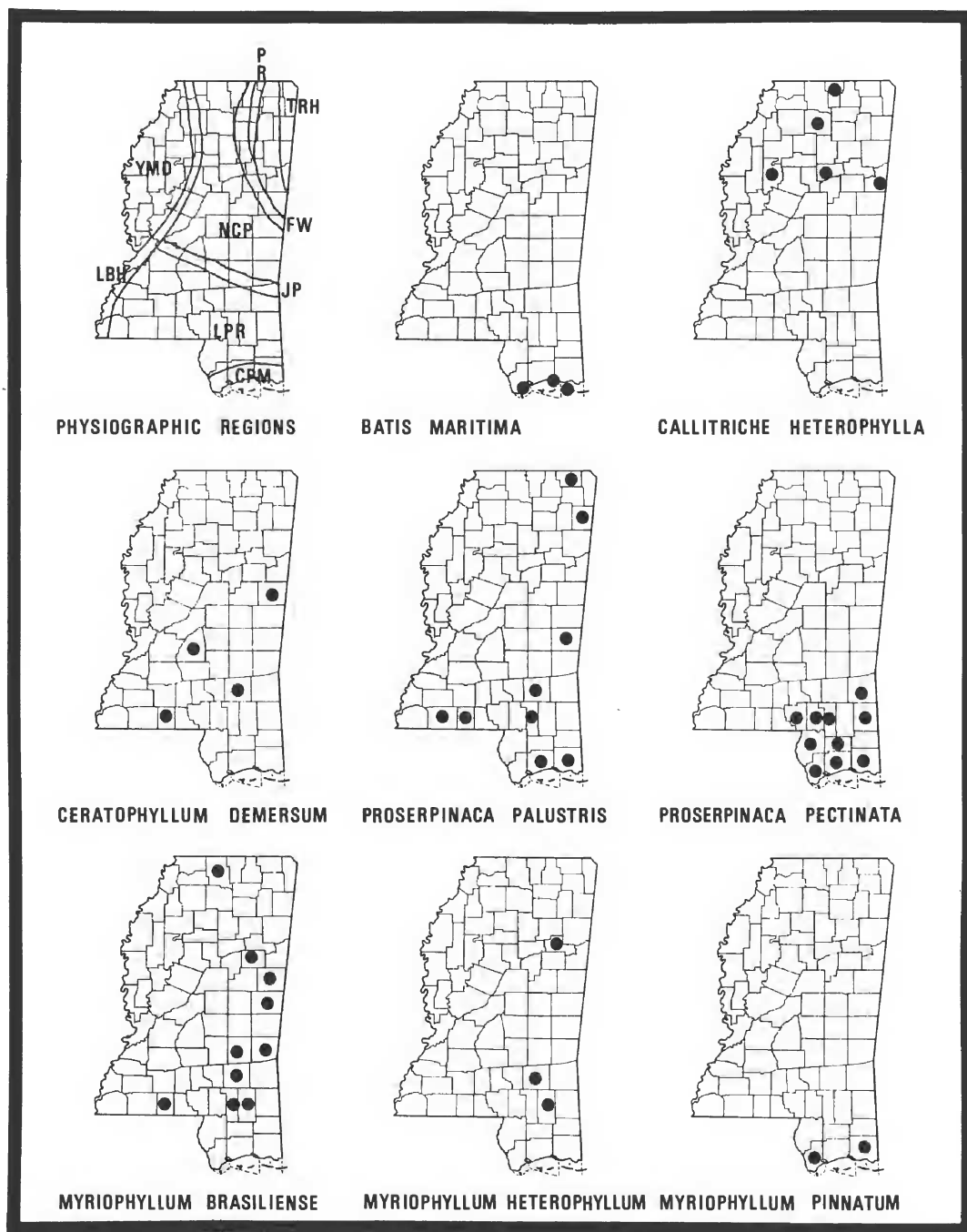


Figure 1. Physiographic regions (see explanation in text) and distribution in Mississippi of *Batis maritima*, *Callitriche heterophylla*, *Ceratophyllum demersum*, *Proserpinaca palustris*, *Proserpinaca pectinata*, *Myriophyllum brasiliense*, *Myriophyllum heterophyllum*, and *Myriophyllum pinnatum*.

3. Fruit pedicelled; wing and thin margin of carpel turned outward at right angles to the surface of the fruit or revolute and appearing like a thickened margin
3. Fruit almost sessile; margin of carpel appearing as if not winged but under high magnification showing a minute wing

3. *C. nuttallii*.
4. *C. terrestris*.

1. *C. heterophylla* Pursh *emend.* Darby, Mar.—Oct. Shallow water of ponds, sluggish streams, wet ditches; NCP, NPB, YMD. Fig. 1.
 2. *C. peploides* Nutt., Mar.—Oct. Muddy or sandy wet ditches; Pearl River Co.
 3. *C. nuttallii* Torr., Mar.—May. Damp soil, fallow fields, flats; Harrison Co.
 4. *C. terrestris* Raf. *emend.* Torr., Mar.—June. Damp soil, moist lawns, open disturbed habitats; YMD, LPR, Sharkey and Lamar Counties. *C. deflexa* A. Br.—R, G; *C. deflexa* var. *austini* (Engelm.) Hegelm.—F. Plants of the last three species are easily overlooked and are probably more common than our records indicate. The treatment of *Callitriche* was adapted in part from that of Fassett (1951).

CERATOPHYLLACEAE

1. CERATOPHYLLUM L. HORNWORT, COONTAIL

1. Leaf segments conspicuously serrate on one side, leaves usually forked only 1 or 2 times
1. Leaf segments entire or nearly so, leaves usually forked 2 to 4 times

1. *C. demersum*.
2. *C. echinatum*.

1. *C. demersum* L., June—Aug. Quiet water of lakes, ponds, slow streams; LPR, NPB; in southern Mississippi. Fig. 1.
 2. *C. echinatum* Gray, June—Aug. Quiet water of streams, lakes; reported by R to be in Mississippi but no specimens have been seen.

ELATINACEAE

1. ELATINE L. WATERWORT

1. *E. triandra* Schkuhr, May—June. Shallow water of lake shore; NCP, Clarke Co. *E. americana* (Pursh) Arn.—F. *E. triandra* var. *americana* (Pursh) Fassett—G. Useful references on *Elatine* include Fassett (1939) and Duncan (1964).

HALORAGACEAE R. Br.

1. Leaves alternate; flower parts in threes
1. Leaves whorled; flower parts in fours

1. *Proserpinaca*.
2. *Myriophyllum*.

1. PROSERPINACA L. MERMAID-WEED

1. Upper leaves lanceolate and serrate, submersed leaves pinnately divided
1. All leaves pinnately divided

1. *P. palustris*.
2. *P. pectinata*.

1. *P. palustris* L., May—Oct. Shallow water of swamps, ponds, about springs, along streams, in ditches; TRH, LPR, CPM. *P. amblygona* (Fern.) Small; *P. platycarpa* Small—S; *P. palustris* var. *amblygona* Fern.—F. Fig. 1.
 2. *P. pectinata* Lam., Apr.—Aug. Acid, peaty soils of swamps and savannahs, in shallow water of bay heads, ditches; LPR, CPM. Fig. 1.

2. MYRIOPHYLLUM L. WATER-MILFOIL

1. Leaves pectinate, feather-like, mostly emersed
1. Emerged leaves not pectinate, most leaves submersed.
 2. Submersed leaves with 5 to 10 capillary divisions on each side; seeds with smooth ridges
 2. Submersed leaves with about 5 capillary divisions on each side; seeds with 2 prominently tuberculate ridges

1. *M. brasiliense*.
2. *M. heterophyllum*.
3. *M. pinnatum*.

1. *M. brasiliense* Camb., PARROT'S FEATHER, WATER FEATHER. Mar.—Nov. Ponds, ditches, streams, moist soil; scattered throughout; native of South America escaping from cultivation and becoming persistent. *M. proserpinacoides* Gil.—S. Fig. 1.
2. *M. heterophyllum* Michx., Apr.—Aug. Ponds, lakes, streams; NPB, LPR. Fig. 1.
3. *M. pinnatum* (Walt.) B.S.P., Apr.—Oct. Swamps, ponds, streams; CPM. Fig. 1.

HYDROPHYLLACEAE

- | | |
|--|-----------------------|
| 1. Leaves entire; ovary two-celled; plants aquatic | 3. <i>Hydrolea</i> . |
| 1. Leaves toothed or compound; ovary one-celled; plants not true aquatics. | |
| 2. Flowers solitary in leaf axils | 1. <i>Nemophila</i> . |
| 2. Flowers several to many in a cyme | 2. <i>Phacelia</i> . |

1. NEMOPHILA Nutt. BABY BLUE EYES

1. *N. microcalyx* (Nutt.) Fisch. & Mey., Mar.—Apr. Moist rich woods; LBH. Fig. 2. The distribution of *Nemophila microcalyx* is shown in Constance (1941).

2. PHACELIA Juss. SCORPION WEED

1. *P. dubia* (L.) Trel., Apr.—May. Roadsides, fields; NPB.

3. HYDROLEA L.

- | | |
|---|-----------------------------|
| 1. Leaves ovate; calyx shorter than the corolla | 1. <i>H. ovata</i> . |
| 1. Leaves lanceolate; calyx equal to the corolla in length. | |
| 2. Calyx glabrous or very minutely and inconspicuously puberulent | 2. <i>H. uniflora</i> . |
| 2. Calyx sparsely hirsute with spreading hairs | 3. <i>H. quadrivalvis</i> . |

1. *H. ovata* Choisy, July—Sept. Roadside ditches, margins of ponds, moist soil along rivers; NCP, CPM. *Nama ovatum* (Nutt.) Britt.—S. Fig. 2.
2. *H. uniflora* Raf., July—Aug. Low roadsides, moist soil along lakes, rivers, in shallow water of ponds; NCP, LBH, LPR. *Nama affinis* Gray—S. Fig. 2.
3. *H. quadrivalvis* Walt., July—Oct. Wet soil; LPR, Forrest County. *Nama quadrivalve* (Walt.) O. Ktze.—S. A comprehensive reference for this family is Wilson (1960).

LENTIBULARIACEAE

- | | |
|---|-------------------------|
| 1. Rosette of leaves not present, leaves inconspicuous; calyx 2-lobed | 1. <i>Utricularia</i> . |
| 1. Rosette of conspicuous leaves present; calyx 5-lobed | 2. <i>Pinguicula</i> . |

1. UTRICULARIA L. BLADDERWORT

1. Plants usually terrestrial; leaves minute, inconspicuous; bladders minute or none.
 2. Bracts at base of pedicels peltate, bractlets absent; pedicels filiform much longer than the bracts
 2. Bracts at base of pedicels not peltate, minute bractlets present; pedicels stout, usually not longer than the bracts.
 3. Flowers crowded together at the very tip of the scape
 3. Flowers not crowded, separated along the scape
 1. Plants aquatic; leaves conspicuous; bladders present.
 4. Corollas purple to rose-purple
 4. Corollas yellow.
 5. Petioles inflated forming a ring of floats at the base of the scape
 5. Petioles not inflated.
 6. Lower corolla lip 5—7 mm long, distinctly exceeding the thick, blunt spur . . .
 6. Lower corolla lip 8—10 mm long, about equaling or slightly shorter than the conic spur.
- | |
|-------------------------|
| 1. <i>U. subulata</i> . |
| 2. <i>U. cornuta</i> . |
| 3. <i>U. juncea</i> . |
| 4. <i>U. purpurea</i> . |
| 5. <i>U. radiata</i> . |
| 6. <i>U. gibba</i> . |

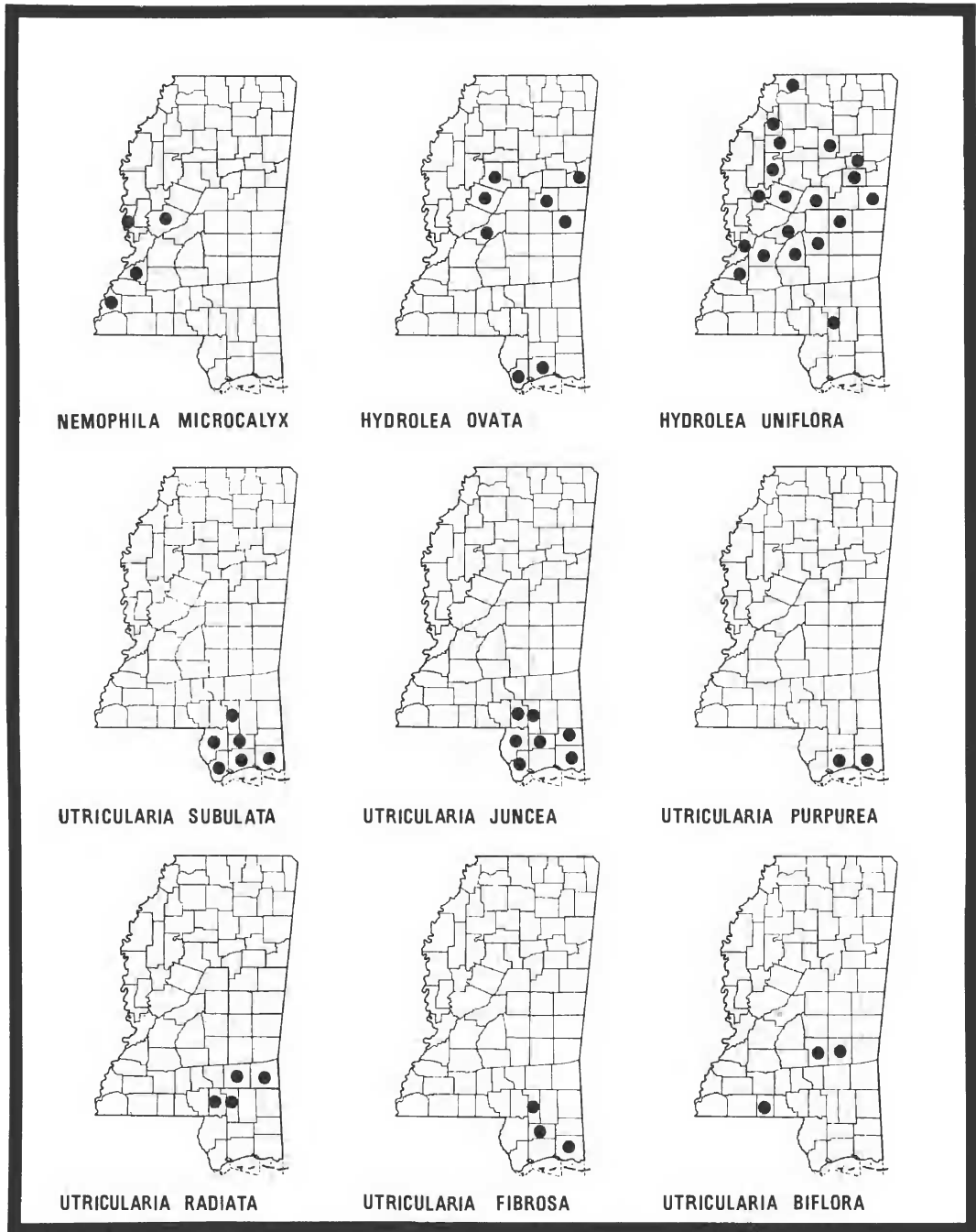


Figure 2. Distribution in Mississippi of *Nemophila microcalyx*, *Hydrolea ovata*, *Hydrolea uniflora*, *Utricularia subulata*, *Utricularia juncea*, *Utricularia purpurea*, *Utricularia radiata*, *Utricularia fibrosa*, and *Utricularia biflora*.

- | | |
|---|------------------------|
| 7. Leafy branches from the base of the flower stalk dimorphic, some with
and some without bladders | 7. <i>U. fibrosa</i> . |
| 7. Leafy branches all bearing numerous bladders | 8. <i>U. biflora</i> . |

1. *U. subulata* L., Mar.—May. Wet acid soil of bogs, pine flatwoods, bayheads, grassy savannas; LPR, CPM. *Setiscapella subulata* (L.) Barnh., *S. cleisigama* (Gray) Barnh.—S. Fig. 2.

2. *U. cornuta* Michx., HORNED BLADDERWORT. July—Sept. Wet acid soil of bogs, moist pinelands; LPR, Forrest Co. *Stomoisia cornuta* (Michx.) Raf.—S.

3. *U. juncea* Vahl., July—Sept. Sandy soil of bogs, ditches, depressions; LPR, CPM. *Stomoisia juncea* (Vahl.) Barnh., *S. virgatula* Barnh.—S. Fig. 2.

4. *U. purpurea* Walt., PURPLE BLADDERWORT. Apr.—July. Submerged in water of shallow depressions, ponds, ditches; CPM. *Vesiculina purpurea* (Walt.) Raf.—S. Fig. 2.

5. *U. radiata* Small, FLOATING BLADDERWORT. Apr.—Sept. Floating on oxbow lakes, depressions, ditches; LPR. *U. inflata* Walt. var. *minor* (L.) Chapm.—R, F. Fig. 2.

6. *U. gibba* L., Apr.—Sept. Mud of marshes, margins of lakes, pools; YMD, NCP, Quitman and Madison Counties.

7. *U. fibrosa* Walt., Apr.—Sept. Shallow water of swamps, ponds; LPR, CPM. Fig. 2

8. *U. biflora* Lam., May—Sept. Shallow ponds, swamps; LPR. *U. pumila* Walt.—S. Fig. 2.

The key was adapted from the treatment by Correll and Correll (1972). Useful references on *Utricularia* include Reinert and Godfrey (1962) and Kondo (1972). The available specimens of *Utricularia* are of poor quality; additional collections are badly needed.

2. PINGUICULA L. BUTTERWORT

- | | |
|---|-----------------------------|
| 1. Expanded corolla not, or rarely, exceeding 1.5 cm across; rosettes rarely exceeding
3 cm in width | 1. <i>P. pumila</i> . |
| 1. Expanded corolla 1.8 cm or more across; rosettes 5 cm or more in width. | |
| 2. Flowers sulphur to golden yellow | 2. <i>P. lutea</i> . |
| 2. Flowers violet to whitish. | |
| 3. Leaves dull red or reddish-green; lobes of the corolla deeply incised | 3. <i>P. planifolia</i> . |
| 3. Leaves bright to yellowish green; lobes of the corolla merely notched | 4. <i>P. primuliflora</i> . |
1. *P. pumila* Michx., Mar.—May. Moist, acid, sandy soil of pine flatwoods, savannas; se LPR, CPM. Fig. 3.
2. *P. lutea* Walt., Mar.—May. Moist to wet sandy-peaty soils of bogs, pine flatwoods, savannas; se LPR, CPM. Fig. 3.
3. *P. planifolia* Chapm., Mar.—May. Shallow water at margins of depressions in flatwoods, ditches; se LPR, CPM. Fig. 3.
4. *P. primuliflora* Wood & Godfrey, Mar.—May. Shallow water of seepage areas, along streams, ditches, often in shade; se LPR, CPM. Fig. 3.

This treatment was adapted from that of Godfrey and Stripling (1961) and Wood and Godfrey (1957).

LYTHRACEAE

- | | |
|--|---------------------------|
| 1. Large terrestrial shrub or small tree | 1. <i>Lagerstroemia</i> . |
| 1. Herbs or aquatic suffrutescent shrub. | |
| 2. Aquatic suffrutescent shrub | 2. <i>Decodon</i> . |
| 2. Herbaceous plants. | |
| 3. Flowers irregular; calyx spurred at base | 7. <i>Cuphea</i> . |
| 3. Flowers regular; calyx not spurred at base. | |
| 4. Calyx cylindrical, elongated | 3. <i>Lythrum</i> . |
| 4. Calyx campanulate, becoming globose with age. | |
| 5. Flowers usually two or more in leaf axils; capsules bursting irregularly;
leaf bases auriculate | 4. <i>Ammannia</i> . |
| 5. Flowers solitary in leaf axils; capsules either indehiscent or regularly
dehiscent; leaf bases not auriculate. | |
| 6. Petals absent; plant a submerged aquatic; capsules indehiscent | 5. <i>Didiplis</i> . |
| 6. Petals present; plant terrestrial or of wet soil; capsules regularly
dehiscent | 6. <i>Rotala</i> . |

The paper by Graham (1964) is a useful general reference for the Lythraceae.

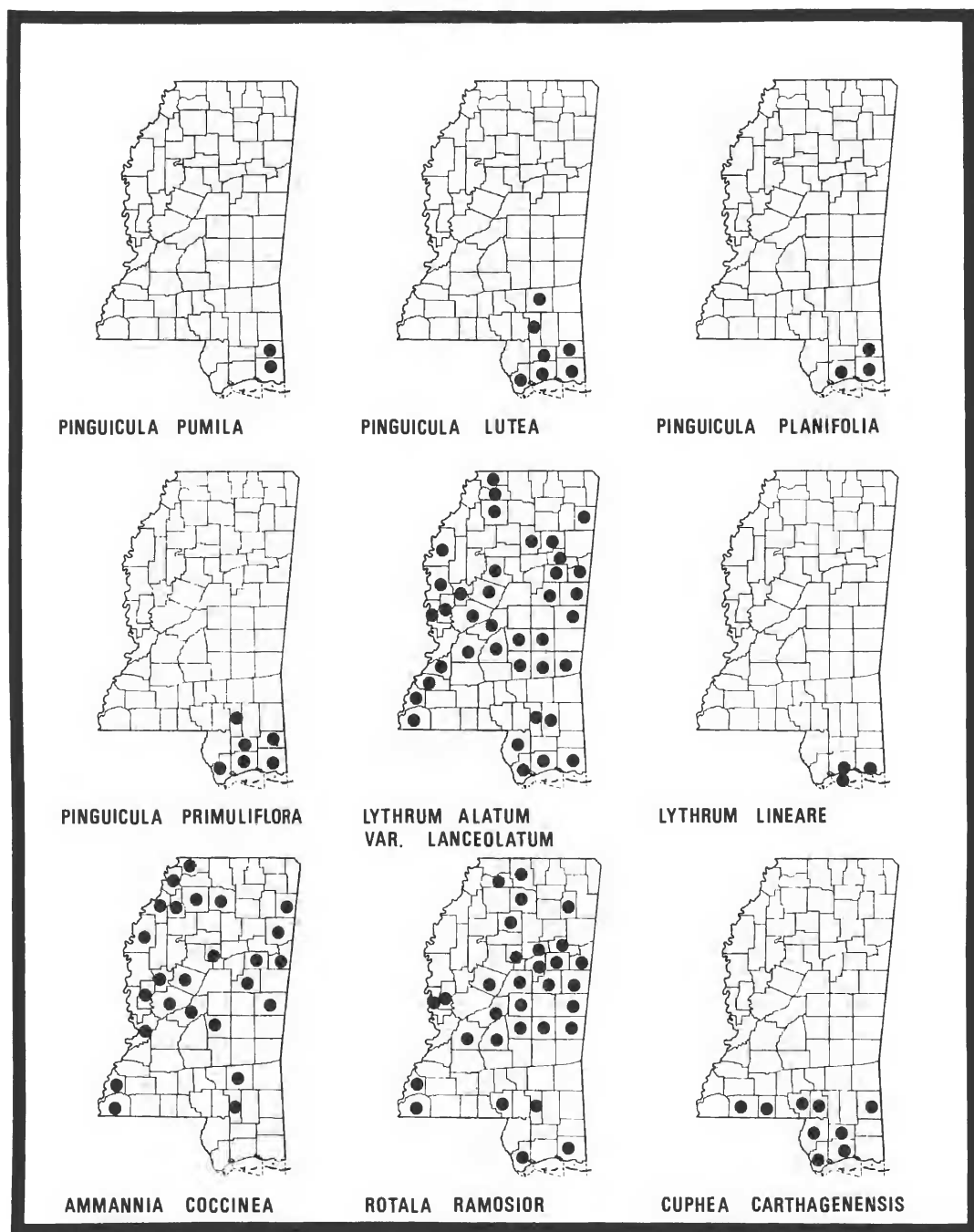


Figure 3. Distribution in Mississippi of *Pinguicula pumila*, *Pinguicula lutea*, *Pinguicula planifolia*, *Pinguicula primuliflora*, *Lythrum alatum* var. *lanceolatum*, *Lythrum lineare*, *Ammannia coccinea*, *Rotala ramosior*, and *Cuphea carthagenensis*.

1. LAGERSTROEMIA L. CRAPE MYRTLE

1. *L. indica* L., July–Sept. An attractive Old World shrub that is widely cultivated for its showy flowers, occurring about abandoned house sites; throughout.

2. DECODON J. F. Gmel.

1. *D. verticillatus* (L.) Ell., SWAMP-LOOSESTRIFE, WATER WILLOW. July–Oct. Bogs, swamps, margins of lakes; NCP, one old collection from Lauderdale County. The site was visited several times but this species was not seen; it should be looked for in the vicinity of Lauderdale Springs and elsewhere in east-central Mississippi.

3. LYTHRUM L. LOOSESTRIFE

- | | |
|---|--|
| 1. Stem leaves widest at the base, more or less clasping | 1a. <i>L. alatum</i> var. <i>alatum</i> . |
| 1. Stems narrowed at the base, attenuate, not clasping. | |
| 2. Stem leaves lanceolate, bracteal leaves usually alternate; mostly inland, sometimes near the coast | 1b. <i>L. alatum</i> var. <i>lanceolatum</i> . |
| 2. Stem leaves linear, bracteal leaves usually opposite; only along the coast | 2. <i>L. lineare</i> . |

1a. *L. alatum* Pursh var. *alatum*, June–July. Roadside; LBH, Desoto County.

1b. *L. alatum* Pursh var. *lanceolatum* (Ell.) T. & G., June–Aug. Roadsides, bottomlands, prairies, fields; throughout. Fig. 3. *L. lanceolatum*—R.

2. *L. lineare* L., July–Aug. Salt marshes, and sandy areas along the Coast. Fig. 3.

Adapted from treatments by Graham (personal communication) and Shinnars (1953).

4. AMMANNIA L.

- | | |
|--------------------------------------|--------------------------|
| 1. Style over 1.5 mm long | 1. <i>A. coccinea</i> . |
| 1. Style about 0.5 mm long | 2. <i>A. latifolia</i> . |

1. *A. coccinea* Rottb., July–Sept. Ditches, swamps, around the margins of ponds; throughout. Fig. 3.

2. *A. latifolia* L., July–Sept. Tidal marshes, Jackson Co. Shirley A. Graham (personal communication) has seen one specimen from Mississippi: Tracy 6424, Horn Island, Jackson County. *A. koehnei* Britt.—S; *A. teres* Raf.—R.

5. DIDIPLIS Raf. WATER PURSLANE

1. *D. diandra* (Nutt.) Wood, May–Sept. Roadside ditches, marshes, pools, ponds; NCP, Kemper and Newton Counties. *Peplis diandra* Nutt.—R. Shirley Graham (personal communication) indicated that the generic status of *Didiplis* vs. *Peplis* is an unknown; however, she feels that on the basis of the arguments in Flora Europaea and on pollen differences that ours should be called *Didiplis*.

6. ROTALA L. TOOTH CUP

1. *R. ramosior* (L.) Koehne, July–Sept. Ditches, margins of ponds; throughout. Fig. 3.

7. CUPHEA P. Br. WAXWEED

1. *C. carthagenensis* (Jacq.) Macbr., July–Sept. Wet or moist soil along rivers, in bottomland forests, bogs, low roadsides; LPR, CPM. *Parsonia balsamona* (C. & S.) Standl.—S. Fig. 3.

NYMPHAEACEAE

- | | |
|--|----------------------|
| 1. Submersed leaves palmately dissected; floating leaves small, peltate; stamens 3–6 | 1. <i>Cabomba</i> . |
| 1. Submersed leaves absent; floating or emersed leaves entire or nearly so; stamens many. | |
| 2. Leaves peltate, without a basal sinus. | |
| 3. Plants heavily coated with mucilage; perianth dull purple, 2–3 cm wide | 2. <i>Brasenia</i> . |

- | | |
|---|----------------------|
| 3. Plants not coated with mucilage; perianth yellow or pink, 15–25 cm wide. | 3. <i>Nelumbo</i> . |
| 2. Leaves not peltate, with a basal sinus. | |
| 4. Sepals 4; petals 12 to many, white or yellow, conspicuous | 4. <i>Nymphaea</i> . |
| 4. Sepals 6; petals numerous, small and stamen-like, inconspicuous | 5. <i>Nuphar</i> . |

1. CABOMBA Aubl.

1. *C. caroliniana* Gray, FANWORT. June–Aug. Ponds, lakes, borrow pits, quiet streams; NCP. Fig. 4.
For additional information on *Cabomba* see Fassett (1953).

2. BRASENIA Schreb.

2. *B. schreberi* J. F. Gmel., WATER-SHIELD. June–Aug. Lakes, ponds, slow streams; LPR, common and often weedy. The stems, petioles and lower leaf surfaces are heavily coated with a sticky mucilage. Fig. 4.

3. NELUMBO Adans.

- | | |
|----------------------------|-------------------------|
| 1. Petals yellow | 1. <i>N. lutea</i> . |
| 1. Petals pink | 2. <i>N. nucifera</i> . |

1. *N. lutea* (Willd.) Pers., YELLOW LOTUS, POND-NUT, WATER-CHINQUAPIN. June–Aug. Emergent in shallow lakes, ditches; scattered locations throughout. The tubers and seed are edible and were used as food by Indians. Fig. 4.

2. *N. nucifera* Gaertn., SACRED LOTUS. June–Aug. Emergent in shallow lakes; locally spreading from cultivation, Hinds Co.

4. NYMPHAEA L. WATER-LILIES

- | | |
|----------------------------|-------------------------|
| 1. Petals yellow | 1. <i>N. mexicana</i> . |
| 1. Petals white | 2. <i>N. odorata</i> . |

1. *N. mexicana* Zucc., YELLOW WATER LILY. May–Aug. Lakes, ponds; along the coast. Ken Rogers (personal communication) stated that he collected this species in a pond at Ocean Springs, Jackson Co., but I have not seen this collection.

2. *N. odorata* Ait., WHITE WATER LILY. Apr.–Sept. Ponds, lakes, bayous, slow moving streams; NPB, LPR, CPM, common and often a troublesome aquatic weed. *Castalia odorata* (Ait.) Woodv. & Wood; *C. minor* (Sims) DC.; *C. lekophylla* Small—S. Fig. 4.

For general information on the water-lilies see Small (1931).

5. NUPHAR Sm.

1. *N. luteum* (L.) Sibth. & Sm. ssp. *macrophyllum* (Small) E. O. Beal, YELLOW WATER-LILY, YELLOW COW-LILY, YELLOW POND-LILY, SPATTERDOCK. June–Sept. Lakes, ponds, streams, bayous; NPB, LPR, CPM. *Nymphaea advena* Ait., *N. macrophylla* Small—S; *Nuphar advena* (Ait.) Ait.f.—F, G. Fig. 4.

This treatment is based upon that of Beal (1956); additional information on variation in *Nuphar* can be found in DePoe and Beal (1969).

PODOSTEMACEAE

1. PODOSTEMOM Michx. RIVERWEED

1. *P. ceratophyllum* Michx., June–Nov. Attached to rocks in streams; TRH, Tishomingo Co., hearsay reports in the Leaf, Chunky, and Strong River systems. *P. abrotanoides* Nutt.—S.

POLYGONACEAE

- | | |
|---|-------------------------|
| 1. Plant a woody vine; tendrils present at the tips of branches | 1. <i>Brunnichia</i> . |
| 1. Plant not a woody vine; tendrils absent at the tips of the branches. | |
| 2. Branches appearing internodal | 2. <i>Polygonella</i> . |

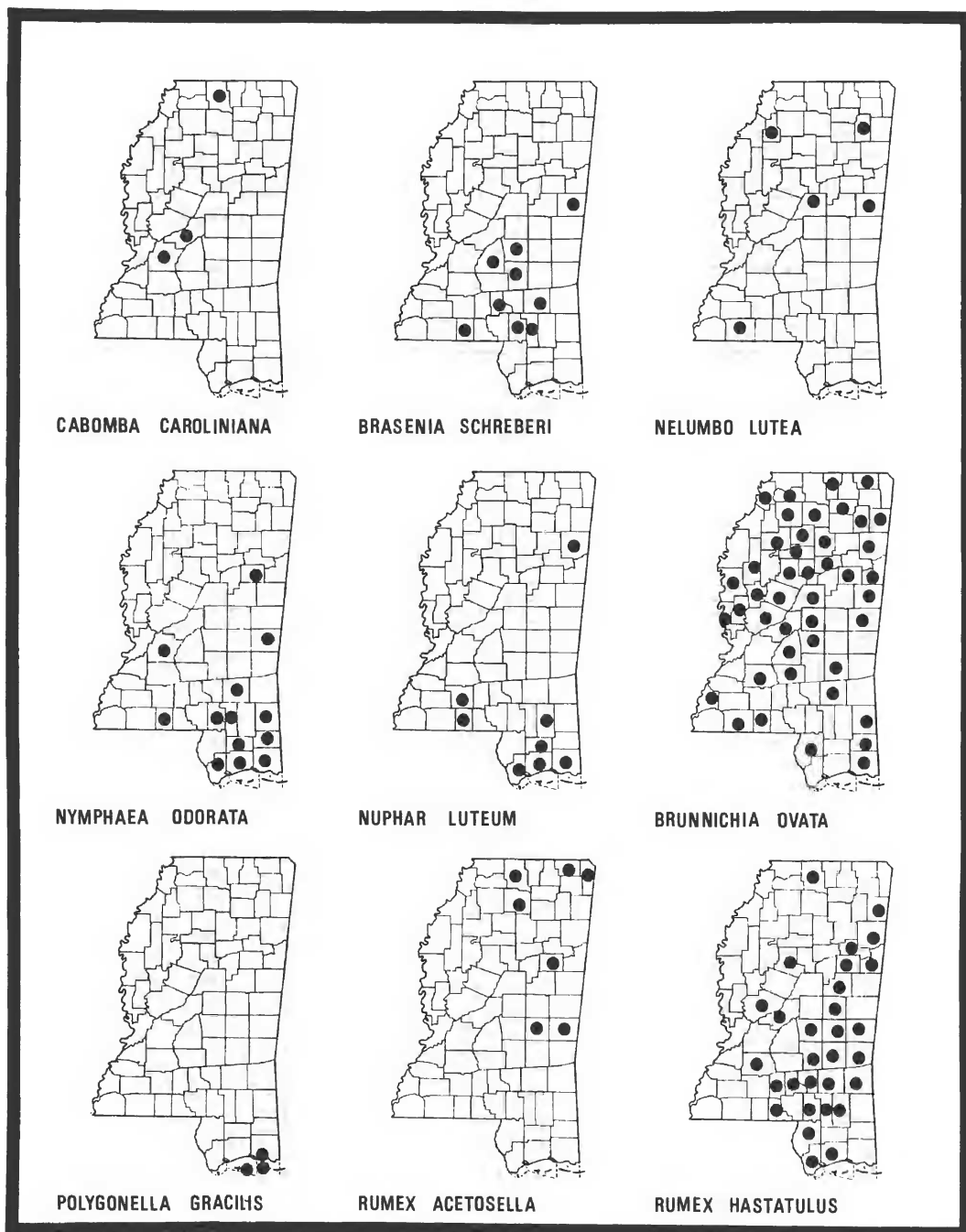


Figure 4. Distribution in Mississippi of *Cabomba caroliniana*, *Brasenia schreberi*, *Nelumbo lutea*, *Nymphaea odorata*, *Nuphar luteum*, *Brunnichia ovata*, *Polygonella gracilis*, *Rumex acetosella*, and *Rumex hastatulus*.

2. Branches appearing nodal.
3. Sepals 6; the inner 3 sepals longer and enlarged in fruit; a basal cluster of leaves usually present 3. *Rumex*.
3. Sepals usually 4 or 5, but, if 6, then the flowers not occurring in many-flowered inflorescences; sepals nearly equal in length in fruit or the inner sepals slightly smaller; a basal cluster of leaves usually not present. 4. *Polygonum*.

A good general reference on the family in the southeastern United States is the paper by Graham and Wood (1965).

1. BRUNNICHIA Banks

1. *B. ovata* (Walt.) Shinnery, LADIES-EARDROPS, EARDROP VINE, BUCKWHEAT VINE. June—July. Low woods, roadsides; common and abundant throughout. *B. cirrhosa* Banks ex Gaertn.—R, F, G, S. Fig. 4.

2. POLYGONELLA Michx. JOINTWEED

1. Plant perennial; leaves persistent on fruiting branches; outer sepals becoming reflexed during anthesis 1. *P. polygama*.
 1. Plant annual; leaves mostly deciduous before fruiting; outer sepals appressed during and after anthesis 2. *P. gracilis*.
 1. *P. polygama* (Vent.) Engelm. & Gray, Aug.—Nov. Sandy soil of roadsides, wasteplaces, sand ridges; LPR, Perry Co. *P. croomi* Chapm.; *P. brachystachya* Meisn.—S.
 2. *P. gracilis* (Nutt.) Meisn., Aug.—Nov. Sandy soil of roadsides, sand ridges, pinelands, beaches; along the coast. *Delopyrum gracile* (Nutt.) Small; *D. filiforme* Small—S. Fig. 4.
- This treatment was adapted from that by Horton (1963).

3. RUMEX L. DOCK

1. Leaves usually hastate or sagittate; usually dioecious.
2. Plant perennial by rhizomes; inner sepals not larger than the achenes 1. *R. acetosella*.
2. Plant a winter annual or short lived perennial without rhizomes; inner sepals becoming much larger than the achene 2. *R. hastatulus*.
1. Leaves not hastate or sagittate; flowers usually bisexual.
3. Inner sepals little if any wider than the face of the achene 3. *R. conglomeratus*.
3. Inner sepals notably wider than the achene.
4. Inner sepals toothed.
5. Whorls of flowers well separated; pedicels about equal to or shorter than the calyx in fruit 4. *R. pulcher*.
5. Whorls of flowers almost touching; pedicels longer than the mature calyx 5. *R. obtusifolius*.
4. Inner sepals with entire or undulate margins.
6. Pedicels 2–5 times as long as the mature flower 6. *R. verticillatus*.
6. Pedicels seldom more than twice as long as the mature flower.
7. Leaves with wavy crisp margins, usually lanceolate 7. *R. crispus*.
7. Leaves flat, without wavy crisp margins, broadly ovate-lanceolate 8. *R. altissimus*.
1. *R. acetosella* L., SHEEP SORREL. Mar.—June. Pastures, fields, roadsides, waste places; NCP, TRH. *Acetosella acetosella* (L.) Small—S. Fig. 4.
2. *R. hastatulus* Baldw. ex Ell., HEART SORREL, RED SORREL. Mar.—May. A common weed of sandy fallow fields, roadsides, waste places; throughout except YMD. Fig. 4.
3. *R. conglomeratus* Murr., May—June. Waste places, pastures; NCP, YMD. Humphreys and Montgomery Counties.
4. *R. pulcher* L., FIDDLE DOCK. May—July. Pastures, roadsides, waste places; throughout, a common weed. Fig. 5.
5. *R. obtusifolius* L., May—Aug. Pastures, roadsides, wasteplaces; infrequent; scattered throughout. Fig. 5.
6. *R. verticillatus* L., SWAMP DOCK. May—Aug. Low places, wet meadows, NCP, LBH, YMD. Fig. 5.
7. *R. crispus* L., YELLOW DOCK, CURLY DOCK. Apr.—July. Pastures, lawns, small grains, wasteplaces, roadsides; throughout, an abundant and troublesome weed especially in pastures and small grains. Fig. 5.
8. *R. altissimus* Wood, PALE DOCK, SMOOTH DOCK. Apr.—Aug. Roadsides, waste places, pastures, often in low areas; throughout. Fig. 5.

This treatment was adapted from that of Rechinger (1937).

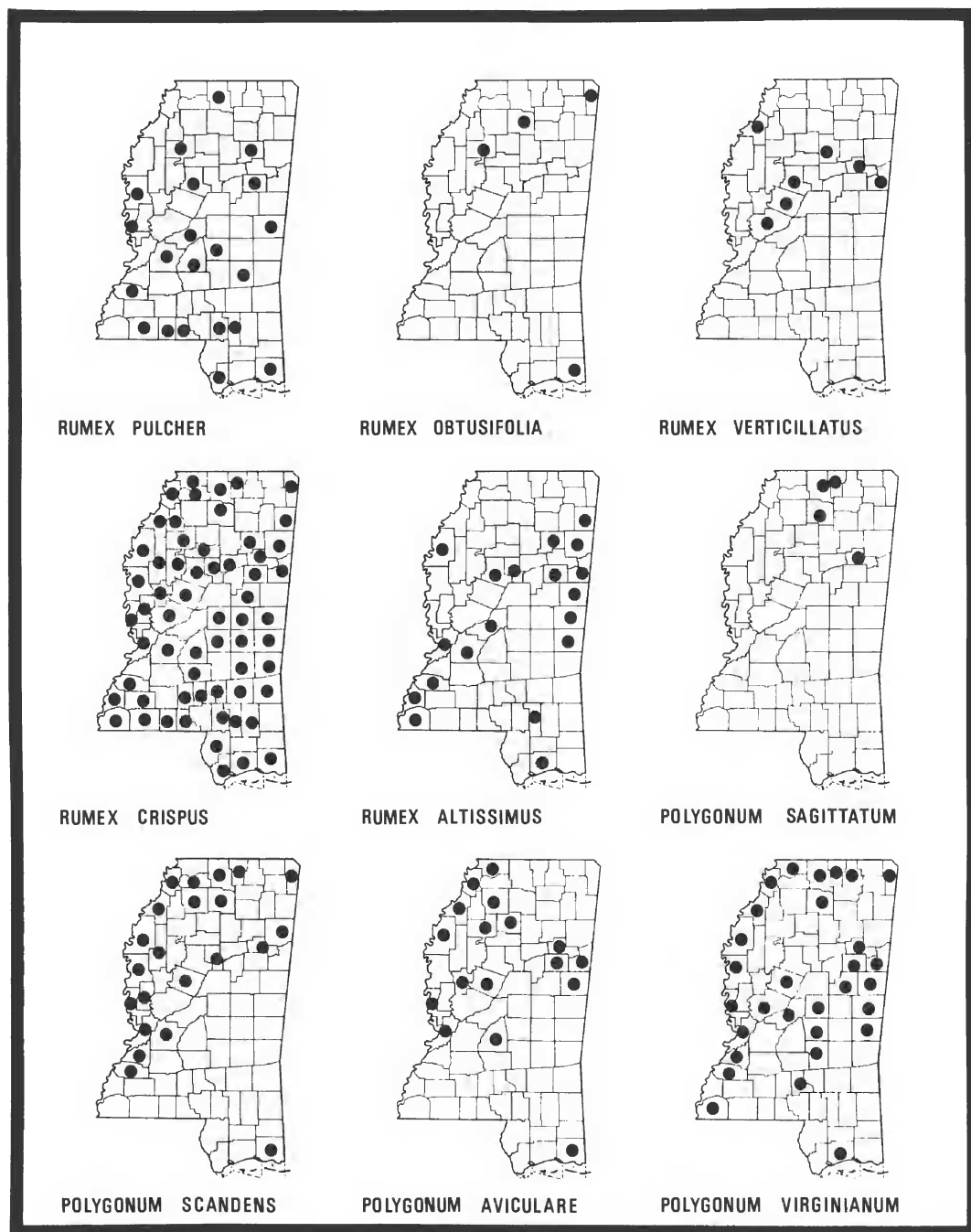


Figure 5. Distribution in Mississippi of *Rumex pulcher*, *Rumex obtusifolia*, *Rumex verticillatus*, *Rumex crispus*, *Rumex altissimus*, *Polygonum sagittatum*, *Polygonum scandens*, *Polygonum aviculare*, and *Polygonum virginianum*.

4. POLYGONUM L. SMARTWEED, KNOTWEED

- | | |
|--|---------------------------------|
| 1. Stems armed with prickles | 1. <i>P. sagittatum</i> . |
| 1. Stems not armed with prickles. | |
| 2. Stems climbing. | 2. <i>P. scandens</i> . |
| 2. Stems not climbing. | |
| 3. Flowers in clusters of 1–3 appearing at the base of the leaves in short clusters in their axils. | |
| 4. Leaves yellow green; principal stem leaves more than 5 mm wide | 3. <i>P. erectum</i> . |
| 4. Leaves glaucous or bluish green; principal stem leaves usually less than 5 mm wide | 4. <i>P. aviculare</i> . |
| 3. Flowers several to many in dense or loose elongated inflorescences arising at the ends of the stems and branches. | |
| 5. Styles 2-cleft, persistent, deflexed at maturity | 5. <i>P. virginianum</i> . |
| 5. Styles 2 or 3 cleft, deciduous at maturity. | |
| 6. Leaves broadly ovate, often heart shaped or broadly rounded at the base. | |
| 7. Leaves floating, glabrous; plant aquatic | 6. <i>P. amphibium</i> . |
| 7. Leaves not floating, pubescent; plant not aquatic. | |
| 8. Stems with soft spreading hairs; leaves soft hairy beneath | 7. <i>P. orientale</i> . |
| 8. Stems glabrous or with appressed hairs; leaves glabrous or with appressed hairs. | 6. <i>P. amphibium</i> . |
| 6. Leaves lanceolate, linear, or oblong, tapered or narrowed to slightly rounded at the base. | |
| 9. Ocreae not ciliate or with cilia less than 0.5 mm long. | |
| 10. Peduncles stipitate glandular or sometimes setose just below the inflorescence; sepals with irregularly forked nerves. | |
| 11. Styles and stamens included within the calyx; achenes with both faces convex, 2.5–3.1 mm long | 8. <i>P. pennsylvanicum</i> . |
| 11. Styles and/or stamens protruding from calyx; achenes with one face concave, 3–4.7 mm long | 9. <i>P. bicornis</i> . |
| 10. Peduncles either glabrous or with sessile glands just below the inflorescence; sepals strongly 3-nerved, each nerve terminating in an anchor-shaped fork | 10. <i>P. lapathifolium</i> . |
| 9. Ocreae with cilia more than 0.5 mm long. | |
| 12. Calyx glandular-punctate. | |
| 13. Achenes dull | 11. <i>P. hydropiper</i> . |
| 13. Achenes shining | 12. <i>P. punctatum</i> . |
| 12. Calyx not glandular-punctate. | |
| 14. Plants perennial from woody rhizomes. | |
| 15. Leaves usually strigose, usually 15 mm or more wide | 13. <i>P. setaceum</i> . |
| 15. Leaves usually glabrous, usually less than 15 mm wide | 14. <i>P. hydropiperoides</i> . |
| 14. Plants annual. | |
| 16. Ocreae cilia up to 4 mm long, less than 1/2 as long as the ocreae; achenes 2–2.5 mm long | 15. <i>P. persicaria</i> . |
| 16. Ocreae cilia more than 5 mm long, more than 1/2 as long as the ocreae; achenes 1.5–2.1 mm long | 16. <i>P. cespitosum</i> . |

1. *P. sagittatum* L., TEAR-THUMB. July–Oct. Wet soil around ponds, along streams; NCP, NPB. *Tracaulon sagittatum* (L.) Small—S. Fig. 5.

2. *P. scandens* L., CLIMBING BUCKWHEAT. July–Oct. Low woods; throughout. *Bilderdykia scandens* (L.) Greene; *B. cristate* (Engelm. & Gray) Greene; *B. dumetorum* (L.) Dum.—S; *P. cristatum* Engelm. & Gray—F; *P. scandens* var. *dumetorum* (L.) Gl.—G. Fig. 5.

3. *P. erectum* L., June–Oct. Waste places; Oktibbeha Co.

4. *P. aviculare* L., sens. lat. Knotweed. May–Oct. Dry waste places; YMD, LBH, NCP, NPB. Fig. 5. *P. neglectum* Bess.; *P. buxiforme* Small—S. (see Mertens and Raven 1965).

5. *P. virginianum* L., JUMPSEED. July–Oct. Rich woods, alluvial forests; throughout. *Tovara virginiana* (L.) Raf.—R, S. Li (1952) presented a good argument for the separation of *P. virginianum* from *Polygonum* citing: the number of calyx lobes; the fact that the calyx lobes enlarge but little, if any, in fruit; the hooked style branches; and the peculiar

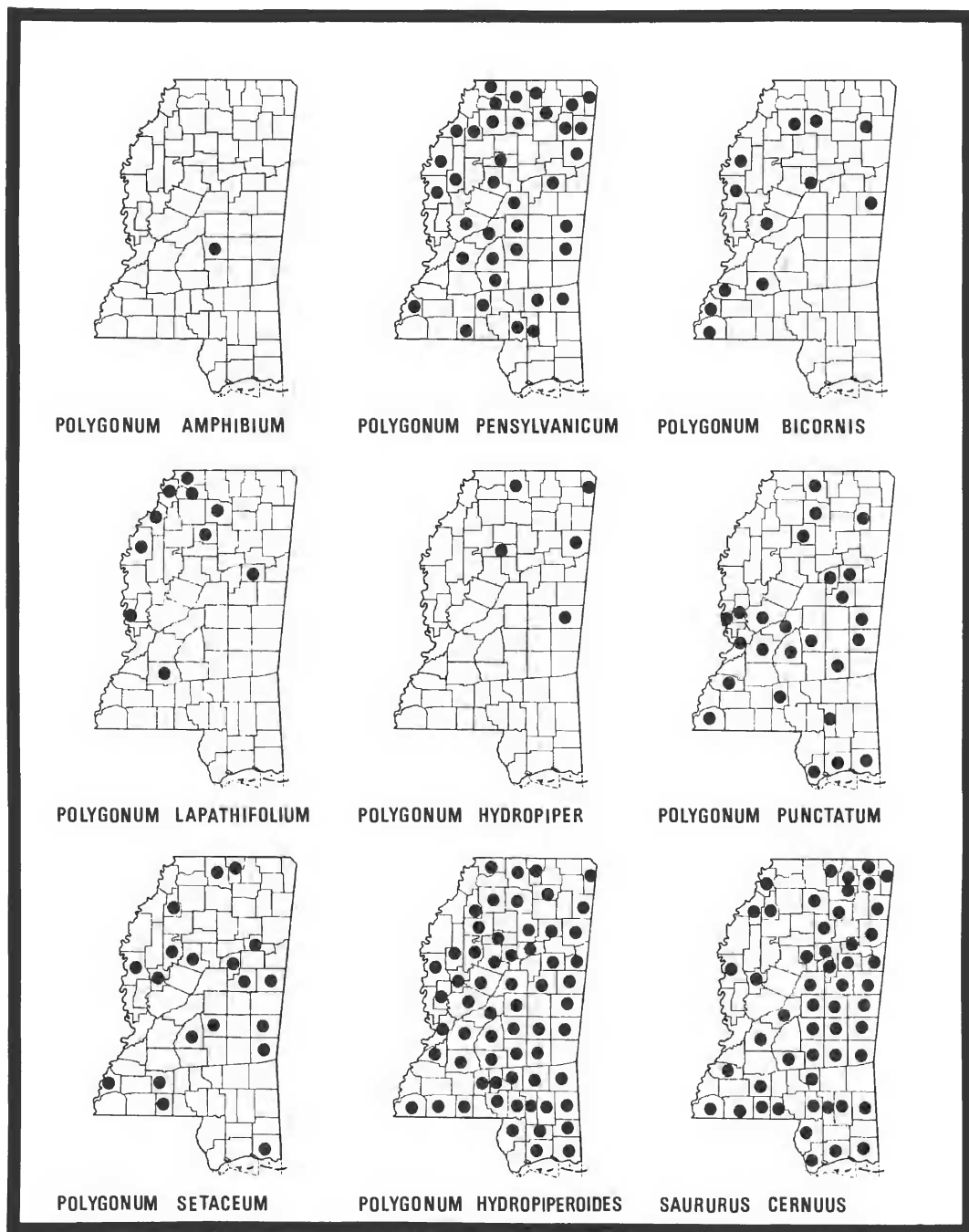


Figure 6. Distribution in Mississippi of *Polygonum amphibium*, *Polygonum pensylvanicum*, *Polygonum bicornis*, *Polygonum lapathifolium*, *Polygonum hydropiper*, *Polygonum punctatum*, *Polygonum setaceum*, *Polygonum hydropiperoides*, and *Saururus cernuus*.

inflorescences. If segregated, the name should be *Antenoron virginianum* (L.) Roberty & Vautier. since *Tovaria* is not valid. Fig. 5.

6. *P. amphibium* L. WATER SMARTWEED. July–Oct. Margins of swamps, lakes, rare; JP, Scott Co. A highly variable species. *Persicaria muhlenbergii* (Meisn.) Small—S; *P. coccineum* Muhl. ex Willd.—R, G, F. (see Mitchell 1968). Fig. 6.

7. *P. orientale* L., KISS-ME-OVER-THE-GARDEN-GATE, PRINCESS-FEATHER. July–Oct. Sometimes escaping from cultivation to waste places; YMD, Washington Co. *Persicaria orientalis* (L.) Spach.—S.

8. *P. pensylvanicum* L., PINKWEED. June–Oct. Fields, waste places; common throughout except CPM; often troublesome. *Persicaria pennsylvanica* (L.) Small.—S. Fig. 6.

9. *P. bicornis* (Raf.) Nieuw., July–Oct. Low ground near streams; throughout, except LPR, CPM. *Persicaria mississippiensis* (Stanford) Small; *Persicaria longistyla* Small—S; *Polygonum longistylum* Small—F, G. Fig. 6.

10. *P. lapathifolium* L., July–Oct. Alluvial fields, waste places; mainly YMD. *Persicaria lapathifolia* (L.) S. F. Gray—S. Fig. 6.

11. *P. hydropiper* L., WATER PEPPER. June–Oct. Alluvial fields, waste places; NCP, TRH, NPB. *Persicaria hydropiper* (L.) Opiz.—S. Fig. 6.

12. *P. punctatum* Ell., WATER SMARTWEED. July–Oct. Alluvial fields, wet places, ditches; common throughout. *Persicaria punctata* (Ell.) Small—S. (see Fassett 1949). Fig. 6.

13. *P. setaceum* Baldw. ex Ell., July–Oct. Alluvial woods; throughout. *Persicaria setacea* (Baldw.) Small—S; *Polygonum hydropiperoides* var. *setaceum* (Baldw.) Gl.—G. Fig. 6.

14. *P. hydropiperoides* Michx., July–Oct. Margins of swamps, streams, ditches, lakes; common and abundant throughout. *Persicaria hydropiperoides* (Michx.) Small; *P. opelousana* (Ridd.) Small—S; *Polygonum opelousanum* Ridd.—G, F; *P. hydropiperoides* var. *opelousanum* (Ridd. ex Small) Stone—R. Fig. 6.

15. *P. persicaria* L., June–Oct. Waste places; NCP, NPB, Carrol and Oktibbeha Counties. *Persicaria persicaria* (L.) Small—S.

16. *P. cespitosum* Blume., June–Oct. Alluvial fields, moist soil around ponds; NCP, Madison Co.

SAURURACEAE

1. SAURURUS L.

1. *S. cernuus* L., LIZARD'S TAIL. June–Sept. In shallow water or muddy soils of low woods, swamps; throughout. Fig. 6.

ACKNOWLEDGEMENTS

Support for the field work, begun in 1964, was provided by two National Science Foundation research grants to the Mississippi Flora project, and later support was provided to me by the University of Georgia. Drs. Tom Pullen and Ray Watson are my co-investigators on the Mississippi Flora project; Lionel Eleuterius of the Gulf Coast Research Laboratory helped in many ways, especially with the coastal plants; and

F. H. Sargent and Ken Rogers made many good collections; the first draft of this treatment was read and criticized by A. E. Radford; the Polygonaceae was edited by J. H. Horton; Shirley A. Graham provided helpful comments on the Lythraceae; and Ms. Mary Ann Keller and later Ms. Katie Chancey both patiently prepared the typescript for this manuscript. I am indebted to all of these individuals and to many others who have made this work possible.

LITERATURE CITED

- Beal, E. O. 1956. Taxonomic revision of the genus *Nuphar* Sm. of North America and Europe. *J. Elisha Mitchell Sci. Soc.* 72:317–346.
- Constance, L. 1941. The genus *Nemophila* Nutt. *Univ. Calif. Pub. Bot.* 19:341–398. (cf p 350).
- Correll, D. S. & H. B. Correll. 1972. *Aquatic and wetland plants of southwestern United States*. E.P.A. U.S. Gov. Printing Office, Washington, D.C. 1777 pp.
- & M. C. Johnston. 1970. *Manual of the Vascular Plants of Texas*. Texas Res. Foundation. Renner, Tex. 1881 pp.
- Depoe, C. E. & E. O. Beal. 1969. Origin and maintenance of clinal variation in *Nuphar* (Nymphaeaceae). *Brittonia* 21:15–28.
- Duncan, W. H. 1964. New *Elatine* (Elatinaceae) populations in the southeastern United States. *Rhodora* 66:47–53.
- Fassett, N. C. 1939. Notes from the herbarium of the University of Wisconsin-XVII. *Elatine* and other aquatics. *Rhodora* 41:367–376.
- . 1949. The variations of *Polygonum punctatum*. *Brittonia* 6:369–393.
- . 1951. *Callitriche* in the New World. *Rhodora* 53:137–155. 161–182; 185–194; 209–222.
- . 1953. A monograph of *Cabomba*. *Castanea* 18:116–128.
- Fernald, M. L. 1950. *Gray's Manual of Botany*, 8th ed. American Book Co., N.Y. 1632 pp.
- Gleason, H. A. & A. Cronquist. 1963. *Manual of Vascular Plants of Northeastern United States and Adjacent Canada*. Van Nostrand-Reinhold Co. N.Y. 810 pp.
- Godfrey, R. K. & H. L. Stripling. 1961. A synopsis of *Pinguicula*

- (Lentibulariaceae) in the southeastern United States. *Amer. Midl. Nat.* 66:395-409.
- Graham, S. A. 1964. The genera of Lythraceae in the southeastern United States. *J. Arnold Arbor.* 45:235-250.
- & C. E. Wood. 1965. The genera of Polygonaceae in the southeastern United States. *J. Arnold Arbor.* 46:91-121.
- Horton, J. H. 1963. A taxonomic revision of *Polygonella* (Polygonaceae). *Brittonia* 15:177-203.
- Jones, S. B. 1974. Mississippi flora. I. Monocotyledon families with aquatic or wetland species. *Gulf Research Reports* 4(3):357-379.
- Kondo, K. 1972. A comparison of variability in *Utricularia cornuta* and *Utricularia juncea*. *Amer. J. Bot.* 59:23-37.
- Li, H. L. 1952. The genus *Tovara* (Polygonaceae). *Rhodora* 54:19-25.
- Lowe, E. N. 1921. Plants of Mississippi. *Miss. State Geol. Survey Bull.* 17. 293 pp.
- Mertens, T. R. & P. H. Raven. 1965. Taxonomy of *Polygonum* section *Polygonum* (Avicularia) in North America. *Madroño*, 18:85-92.
- Mitchell, R. S. 1968. Variation in the *Polygonum amphibium* complex and its taxonomic significance. *Univ. Calif. Pub. Bot.* 45:1-65.
- Radford, A. E., H. E. Ahles, & C. R. Bell. 1968. *Manual of the vascular flora of the Carolinas*. Univ. N. C. Press, Chapel Hill. 1183 pp.
- Rechinger, K. H. 1937. The North American species of *Rumex*. *Field Mus. Nat. Hist. Bot. Ser.* 17:1-151.
- Reinert, G. W. & R. K. Godfrey. 1962. Reappraisal of *Utricularia inflata* and *U. radiata* (Lentibulariaceae). *Amer. J. Bot.* 49:213-220.
- Shinners, L. H. 1953. Synopsis of the United States species of *Lythrum* (Lythraceae). *Field & Lab.* 21:80-89.
- Small, J. K. 1931. The water lilies of the United States. *J. N.Y. Bot. Gard.* 32:116-121.
- . *Manual of the Southeastern Flora*. (reprint) Univ. N.C. Press, Chapel Hill. 1554 pp.
- Steyermark, J. A. 1963. *Flora of Missouri*. Iowa State Univ. Press. Ames. 1725 pp.
- Wilson, K. A. 1960. The genera of Hydrophyllaceae and Polemoniaceae in the southeastern United States. *J. Arnold Arbor.* 41:197-212.
- Wood, C. E. & R. K. Godfrey. 1957. *Pinguicula* (Lentibulariaceae) in the southeastern United States. *Rhodora* 59:217-230.